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GOVERNMENT OF INDIA

DEPARTMENT OF WORKS, MINES AND POWER

Central Boilers Board

NOTIFICATION

New Delhi, the 9th May 1947

No. EL-II/304(2).—The following draft of certain Regulations which the Central Boilers Board proposes to make in exercise of the powers conferred by section 28 of the Indian Boilers Act, 1923 (V of 1923), is published as required by sub-section (1) of section 31 of the said Act for the information of all persons likely to be affected thereby, and notice is hereby given that the draft will be taken into consideration on or after the 1st October 1947.

Any objection or suggestion which may be received from any person in respect of the said draft before the date specified will be considered by the Central Boilers Board. Such objections or suggestions should be addressed to the Secretary, Central Boilers Board, Works, Mines and Power Department, New Delhi.

S. NEELAKANTAM,

Secretary, Central Boilers Board.

INDIAN BOILER REGULATIONS (DRAFT)

FOREWORD

The Indian Boilers Act, 1923 (V of 1923) has been amended by Indian Boilers Amendment Acts (XVII of 1943) and (XXXIV of 1947) to provide for the registration and inspection of Economisers and Feed Pipes. The draft now published (Chapter XI) refers to these Regulations and is in continuation of the draft Boiler Regulations (Chapters I to X) already published in the Gazette of India, Extraordinary, dated 3rd October 1946, for general criticism under Central Boilers Board Notification No. EL-II/304(1) dated 27th September 1946. Some of the extracts in Chapter XI have been incorporated from British Standards Specifications 786 and 806 with the courtesy of the British Standards Institution, London.

CHAPTER XI

STANDARD CONDITIONS FOR THE DESIGN AND CONSTRUCTION OF ECONOMISERS AND FEED PIPES

ECONOMISERS

500 (a)—An economiser shall not be registered under sub-section (4) of section 7 of the Act and a certificate shall not be issued under sub-section (5) of that section with reference to an economiser, unless the standard conditions in respect of material, design and construction, which are specified in this Chapter are satisfied in respect of such economiser.

Provided that an economiser in use at the time Chapter XI of these Regulations came into force, may be so registered and such Certificate may be issued in respect thereof notwithstanding that such standard conditions are not satisfied in respect of such economiser.

(b) Notwithstanding anything contained in sub-regulation (a) the Chief Inspector may, subject to the provisions of Regulation 502, register an economiser and order the issue of a certificate authorising the use thereof, although the standard conditions are not fully satisfied in respect of such economiser.

GENERAL REQUIREMENTS

501 (a). All cast iron and steel headers and the parts used in the assembly of an economiser shall conform with the requirements of this Chapter in respect of material specification and test, workmanship and structural requirements.

(b) All economisers under construction shall be under the supervision of an Inspecting Authority and must be so certified by that Authority.

(c) For economisers imported into British India, a certificate from the Inspecting Authority in Form VII certifying that the material was tested and the economiser built under its supervision shall be furnished to the Chief Inspector before or with the first application for registration.

(d) In advance of or along with an application for registration, the following shall be furnished: (i) a certificate in Form VIII of manufacture and test signed by the Maker or by a responsible representative of the maker, containing the description of the economiser, particulars of the material used in its construction, and the dimensions of the several parts with the declaration that the limits of tensile breaking strength and tests comply with the standard conditions; (ii) a certificate from the Maker of the material, stating the tensile breaking strength and the elongation provided that if the Maker and manufacturer be the same, the manufacturer's precise statement showing the above information shall be accepted.

502. Where no certificates are produced, the working pressure as found by formula will be reduced by 10%. When the workmanship is however in any way doubtful and the Chief Inspector is not satisfied that any of the foregoing conditions would be sufficient to meet the circumstances, he may at his discretion reduce the working pressure by such percentage as he deems fit.

503. Makers' certificate for steel economisers.—The Maker shall furnish the Inspecting Officer with a certificate in the following form:—

“We hereby certify that the material described below has been made by the Open Hearth or an Electric process acid/basic and has been satisfactorily tested in the presence of the Inspecting Officer/our Test House Manager in accordance with the Standard Tests.”

504. For all new economisers the hydraulic test must be applied as shown below:—

| On components before assembly | Hydraulic test pressure |
|--|---|
| Cast Iron Tubes, headers and bends and steel headers . | Twice working pressure; minimum test pressure 500 lbs. per sq. in. |
| Steel Tubes | Twice the working pressure; minimum test pressure of 1,000 lbs. per sq. in. |

The above test pressures shall be held for a minimum period of ten minutes.

505. Material of construction, workmanship and manufacture.—All material used in the construction of pressure parts shall be tested and shall conform with the following requirements :—

(a) The workmanship throughout shall be of the highest possible standard. All castings shall be well finished, free from external defects, porous places and blow holes, and true to dimensions without warping. Where chaplets are used, there must be satisfactory fusion with the metal. Chaplets must be properly tinned with metal free from lead.

(b) The screw threads of all bolts must be of British Standard Whitworth form.

(c) All component parts shall be manufactured to limit gauges to secure interchangeability throughout.

CAST IRON TUBES AND HEADERS

506. Process of manufacture.—The minimum tensile strength based on a test bar 1·2" diameter as cast and machined to ·798" diameter gauge shall not be less than 13 tons for cast iron tubes and 15 tons for cast iron headers and shall not show on analysis a Sulphur and Phosphorous content exceeding the amount specified below :—

| | Maximum | |
|-------------------|---------|-------------|
| | Sulphur | Phosphorous |
| Tubes | ·12% | 1·2% |
| Headers | ·1% | 1·0% |

507. Test bars. (i) When the test bars are cast separately, they shall be poured at the same time and from the same ladle of metal as the casting or castings they represent. The number of test bars specified in Regulation 508 shall be applicable to all castings of each melt.

(b) When the bars are cast on, the mould for the casting and the mould for the test piece shall be joined together in such a manner that the liquid metal fills both moulds at the same operation.

(c) All test bars shall be cast in green sand or dry sand moulds according as to whether the casting or castings they represent are moulded in green sand, or in loam or dry sand respectively.

(d) The test bars shall not be subjected to any heat treatment after leaving the moulds except where the castings are heat treated.

508. Number of tensile tests.—(a) The number of tests required for each batch of castings shall be in accordance with the following table the various classes of castings being divided into 4 representative groups :—

| Group | Weight of castings | Test requirements |
|--|---|---|
| 1 | Up to 28 lbs. | One test for each 30 cwts. of castings or part thereof. |
| 2 | Over 28 lbs. and up to 1 cwt. | One test for each 2 tons of castings or part thereof. |
| 3 | Over 1 cwt. and up to 1 ton. | One test for each 4 tons of castings or part thereof. |
| In the above Groups 1, 2 and 3, all castings represented by one test must be poured from the same ladle of same heat as the bar or bars provided for the test. | | |
| 4 | Over 1 ton and important castings | One test for each 4 tons of castings or part thereof or for each casting weighing 4 tons or more. |

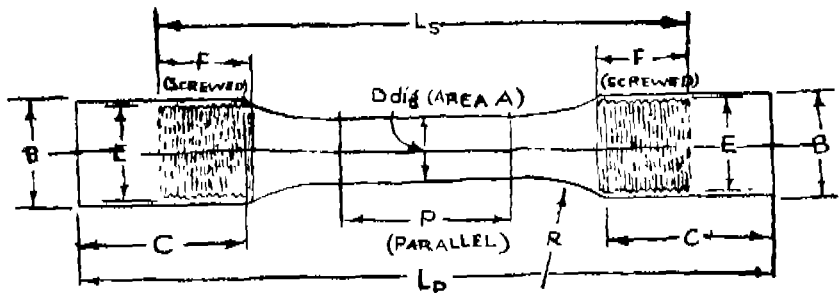
(b) The additional tests to be carried out before a casting or batch of castings is rejected shall be in accordance with the following table :—

| | | |
|----------------|----------------|---|
| 1st test piece | If this fails | The second test piece shall be tested. |
| 2nd test piece | If this passes | The batch or separate castings represented shall be accepted. |
| | If this fails | The batch or separate castings represented may be rejected. |

(c) Provided always that in the case of failure of both test pieces if either show obvious defects a third test piece may be taken from a broken casting or a piece may be cut from a usable casting for further testing as follows :—

| | | |
|----------------|----------------|---|
| 3rd test piece | If this passes | The batch or separate castings represented shall be accepted. |
| | If this fails | The batch or separate castings represented may be rejected. |

509. **Standard test piece.**—The tensile test bar shall conform to the dimensions shown in the following. Bars may be tested with either plain or screwed ends.



DIMENSIONS OF TEST BARS

| Diameter as cast | Gauge Diameter | Area | Min. Parallel length | Min. Radius | Min. Length of plain ends | Screwed ends | | Approximate minimum over-all length | | Main cross-sectional thickness of casting represented |
|------------------|----------------|---------|----------------------|-------------|---------------------------|------------------------------|-------------|-------------------------------------|--------------|---|
| | | | | | | Size | Min. Length | Plain ends | Screwed ends | |
| B | D | A | P | R | C | E | F | Lp | Ls | |
| 1½ | In. | Sq. In. | In. | In. | In. | In. | In. | In. | In. | In. |
| 1-2 | 0.798 | 0.60 | 2 | 3½ | 2 | 1½ B.S.F. 1½ B.S.W. | 1½ | 8½ | 5½ | Over ½ and not exceeding 1½. |

The test bar shall be cast as parallel bars of the Diameter given in column B and then machined to the dimensions D and P in the above table.

CONSTRUCTIONAL REQUIREMENTS**CAST IRON ECONOMISERS**

510 (a) Economisers with pressed socket joints not reinforced.—

$$W. P. = \frac{\text{Area of socket in contact}}{(\text{Width inside Header}) (\text{Pitch of tubes in Header})} \times \text{Friction Factor.}$$

$$W. P. = \text{Working pressure in lbs. per sq. in.} \quad \text{Eqn. (122).}$$

Friction Factor = 525.

(b) Headers for above Economisers.—The maximum working pressure shall be determined by the following formula :—

$$W. P. = \frac{27 (t-3)^2}{b^2} \quad \text{Eqn. (123).}$$

t = Thickness at flat sides in thirtyseconds of an inch.

b = Depth in inches of the inner side exposed to pressure.

511 (a) Economisers with pressed socket joints reinforced.—

$$W. P. = \frac{\text{Area of Socket in contact}}{(\text{Width inside Header}) (\text{Pitch of tubes in Header})} \times \text{Friction Factor}$$

$$+ \frac{\text{No. of stays per header}}{\text{No. of sockets per header.}} \times P. \quad \text{Eqn. (124).}$$

Friction Factor = 525.

P = 600 for approved design of reinforcing stay.

(b) Tubes for above Economisers.—The working pressure shall be governed by the following formula :—

$$W. P. = \frac{280 (t-6)}{d} \quad \text{Eqn. (125).}$$

t = Thickness in thirtyseconds of an inch.

d = External diameter in inches.

512 (a) Headers for Economisers with reinforced socket joints.—These headers shall be of circular section throughout without flat surfaces exposed to internal pressure.

The working pressure shall be governed by the following formula :—

$$W. P. = \frac{250 (t-9)}{d} \quad \text{Eqn. (126).}$$

t = Thickness in thirtyseconds of an inch.

d = External diameter in inches.

(b) Manifold pipes for above Economisers.—These pipes shall be of circular section and the working pressure shall be determined by the following formula :—

$$W. P. = \frac{250 (t-7)}{d} \quad \text{Eqn. (127).}$$

t = Thickness in thirtyseconds of an inch.

d = External diameter in inches.

A = the area exposed to pressure which is assumed to be bounded by a line midway between the pitch line of the bolts and the inner edge of the flange where flat joints are used with joint rings. Where conical joint faces are used with joint rings of curvilinear cross section, the area exposed to pressure shall be assumed to extend to the root of the thread where the tube ends are screwed, or to a corresponding boundary if the flanges are attached by other means.

C = 4,700 for steel bolts of 28/32 tons tensile material, where the diameter over thread is less than 3/4 inch.

= 5,600 for steel bolts of 35/40 tons tensile material, where the diameter over threads is less than 3/4 inch.

= 5,600 for steel bolts of 28/32 tons tensile material, where the diameter over threads is not less than 3/4 inch and not greater than 7/8 inch.

518. Headers for above Economisers.—(a) The main collecting or distributing headers shall be fabricated from solid drawn seamless steel tubing of tensile strength not more than 35 tons per sq. in., the working pressure being determined by the following formula :—

$$W. P. = \frac{325 (t - 1)}{d} \quad \text{Eqn. (132).}$$

t = Thickness in thirtyseconds of an inch.

d = External diameter in inches.

(b) Branches below 2" bore shall be screwed and welded into headers. Larger branches shall be expanded and welded, or secured by some means addition to simple welding. Suitable provision for expansion must be made in the connection between headers and tubes.

(c) The Standard conditions for material and test shall conform to Regulations 520 to 524.

STEEL ECONOMISERS

519. Rectangular Headers.—The material of construction and other requirements for headers shall comply with Regulations 320 to 322 of the (draft) Indian Boiler Regulations, 1946.

520. Tubes : Material.—All tubes forming part of steel economisers which are subject to internal pressure shall be solid drawn and made of steel produced by an acid or basic open hearth or an electric process and shall show on analysis not more than .05% of sulphur or phosphorus.

521. Tensile test.—Longitudinal strips or lengths cut from the ends of the selected pipes shall comply with the following requirements :—

| | Ultimate tensile stress in tons per sq. in. | | Minimum elongation per cent. | | | |
|--|---|---------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|
| | | | on 8 in. | | on 2 in. | |
| | Not less than | Not more than | $\frac{1}{4}$ " thick and over | Less than $\frac{1}{4}$ " thick | $\frac{1}{4}$ " thick and over | Less than $\frac{1}{4}$ " thick |
| Strips cut from the pipes and tested in their curved condition. | 23 | 30 | 20 | 18 | 32 | 30 |
| Test length taken from finished pipes (ends of pipes to be plugged for grips). | 23 | 30 | 25 | 23 | ... | ... |

522. Flattening test (for pipes up to and including 4" nominal bore).—A ring not less than 2" in length cut from one end of each selected pipe shall when cold withstand, without showing either crack or flaw, being flattened between two parallel flat surfaces until the pressure is released the interior surfaces of the test piece remain at the middle a distance apart equal to four times the thickness of the pipe.

523. Cold bend test (for pipes over 4" nominal bore).—A strip $1\frac{1}{2}$ wide cut circumferentially from one end of each selected pipe shall when cold withstand, without showing either crack or flaw, being doubled over in the direction of original curvature round a bar, the diameter of the bar being :—

For pipes up to and including $3/8$ " thick 3 times the thickness.
For pipes over $3/8$ " thick 4 times the thickness.

524. Additional tests before rejection.—Should a pipe selected for testing purposes fail in any one or more of the tests specified, two further tests of the same kind may be made from two additional selected pipes. If the repeat tests are satisfactory the pipes shall be accepted provided that in other respects they comply with the requirements of these Regulations but if failure again occurs, the pipes which the test pipes represent shall be rejected.

525. Constructional requirements. Tubes or pipes. (a) The maximum working pressure shall be :—

$$W. P. = \frac{220 \left(\frac{t}{1.125} - 9 \right)}{D} \quad \text{Eqn. (133).}$$

t = Thickness of tubes in one hundredths of an inch.

D = Outside diameter in inches.

(b) No tube $1\frac{1}{2}$ " or more in diameter shall be less than 10 S.W.G.

(c) The tubes shall be screwed, expanded or welded to the headers.

VALVES AND MOUNTINGS

526 (a) Thermometers.—All economisers shall be provided with Thermometers or measuring water temperature adjacent to the inlet and outlet connections.

(b) Safety valves.—A valve which shall prevent increase of pressure beyond a predetermined limit shall be fitted to every economiser and the design shall provide against unauthorised interference with the loading. Economisers with pressure parts of cast iron and arranged in groups of tiers connected by circulating piping shall have a safety valve fixed on each group of tier. Safety valves should have a minimum diameter of 2".

(c) Pressure Gauge.—Means for indicating the pressure gauge in the economiser shall be provided by a Pressure Gauge constructed on the lines of Regulation 308.

(d) Air release valves.—Means must be provided for the release of air at all points where air accumulation may occur.

(e) Blow off drain valves.—Means must be provided for draining the economiser completely of water.

(f) Non-return valves.—Economisers provided with means for heating the incoming feed by mixing it with hot water from the economiser outlet must have a non-return valve in the hot water return line.

REGULATIONS FOR REGISTRATION AND INSPECTION OF ECONOMISERS

531. Preparation for inspection.—At each inspection the economiser shall be empty and thoroughly cleaned internally and externally and in the flues. All mountings shall be opened up and sufficient caps removed to permit adequate inspection. At least 25% of the caps should be opened in scattered positions and others will be removed in the inspectors' presence to ensure that thorough internal scaling has been carried out prior to his examination.

532. Procedure for registration.—(a) On receipt of an application for registration the Inspector, shall, after the economiser has been prepared for examination, take full particulars of the design and ascertain the working pressure allowed by the Regulations.

(b) If no formulae or co-efficient applicable to any part is contained in the Regulations the Chief Inspector shall at his discretion determine the fitness of the part. The Inspector shall enter full particulars of the economiser together with calculations of the various parts in a Memorandum of Inspection Book (Form No. IX), and submit it to the Chief Inspector.

(c) After inspecting the economiser and ascertaining by the prescribed calculations the maximum pressure to which it may be worked, the Inspector shall witness the hydraulic test in accordance with Regulation 534 and may issue a Provisional Order in Form X.

533. Procedure at subsequent inspection.—(a) After the economiser has been cleaned the Inspector shall make a thorough examination so far as its construction permits. The external condition of the tubes should be carefully noted for wasting especially at the feed inlet end and all accessible tubes should be calipered. The internal surfaces of cast iron tubes should be closely observed for graphitic wasting as far as it is possible and in the event of any tube failure these should be broken up for scrutiny so that the general internal condition of the other tubes may be estimated.

(b) Where tubes or other parts are wasted, the strength should be re-calculated.

(c) The scraper gear should be examined to note if any parts are missing, if the length of travel is adequate and if the scrapers are correctly adjusted.

(d) All cap bolts are to be inspected, also the condition and position of the dampers and baffles.

(e) The record of each inspection and calculations will be entered in the Memo. book.

534. Procedure for Hydraulic test.—Every economiser for registration shall be hydraulically tested in the presence of an Inspector to $1\frac{1}{2}$ times the working pressure. Subsequent hydraulic test may be carried out after repairs or when the Inspector considers it necessary.

During the test all parts externally and in the flues shall be noted for leakages.

535. Memorandum of inspection book.—In this book the Inspector shall enter all particulars and dimensions of the economiser with calculations for the various parts together with details of hydraulic test. At subsequent inspection the Inspector shall enter all notes pertaining to the condition of the various parts.

536. Registration books will be maintained on the lines of Regulation 367.

537. Grant of certificate.—A certificate for the use of an economiser shall be granted in Form XI.

538. Casual visits.—(a) The Inspector shall note if the economiser is working satisfactorily, and if the Safety Valves are correctly adjusted, if the scraper gear is operating and if the external brickwork is free from cracks. He shall also ascertain if the by-pass flue is used when water is not passing through the economiser tubes, i.e., when raising steam, etc.

(b) The Makers' instructions for working should be strictly followed by the owner.

NOTE.—It is recommended that the feed inlet temperature to the economiser should not be less than 100° F. to prevent sweating and consequent external corrosion of the tube and bottom headers.

539. Economiser rating.—The rating shall be equivalent to the area of the heating surface in square feet.

540. Registration fee.—An application for registration shall be accompanied by the appropriate fee.

| | Rs. |
|---|-----|
| For Economiser rating not exceeding 500 | 50 |
| For Economiser rating exceeding 500 but not exceeding 1,000 | 60 |
| For Economiser rating exceeding 1,000 but not exceeding 1,500 | 70 |
| For Economiser rating exceeding 1,500 but not exceeding 2,000 | 80 |
| For Economiser rating exceeding 2,000 but not exceeding 2,500 | 90 |
| For Economiser rating exceeding 2,500 but not exceeding 3,000 | 100 |
| For Economiser rating exceeding 3,000 but not exceeding 3,500 | 110 |
| For Economiser rating exceeding 3,500 but not exceeding 4,000 | 120 |
| For Economiser rating exceeding 4,000 but not exceeding 4,500 | 130 |
| For Economiser rating exceeding 4,500 but not exceeding 5,000 | 140 |
| For Economiser rating exceeding 5,000 | 150 |

541. Engraving of Registry Number.—(a) Each section, branch pipe or detachable part subject to the working pressure shall be marked for identification with a Registry Number and also the appropriate device as shown in Regulation 362.

(b) In the case of the ordinary vertical type of cast iron economisers, the device and number shall be stamped on the header flange connected to the top branch pipe. In each case the stamping shall be on some conspicuous part not affected by the gases or other corroding influence.

FORM VII

INSPECTING AUTHORITY'S CERTIFICATE OF INSPECTION UNDER CONSTRUCTION
DESIGNATION OF INSPECTING AUTHORITY

We hereby certify that Economiser, consisting of sections, and type, tubes to each section was constructed for a working pressure of lbs. by Messrs. under our supervision and inspected at various stages of construction by the Inspecting Officer and that the construction and workmanship were satisfactory and in accordance with the standard conditions for the design and construction of Economiser laid down in Chapter XI of the Indian Boiler Regulations, 1947.

Identification mark on each section,
Branch Pipe or other pressure part.

Position of same.

The sections on completion were subjected to a water pressure of lbs. per sq. in. for ten minutes in the presence of the Inspecting Officer on and satisfactorily withstood the test.

Samples of the material used in the constructions of the Economiser were tested in the presence of the Inspecting Officer and were found to comply with the tests prescribed in Chapter XI of the Indian Boiler Regulations, 1947.

We have satisfied ourselves that the construction and dimensions of the Economiser are as shown in the Makers' drawing No. signed by us and that the particulars entered in the Makers' certificate of manufacture in Form VIII countersigned by us are correct to the best of our knowledge and belief.

Signature of

Dated at this day of
Inspecting Authority.

FORM VIII**Works Address****CONSTRUCTOR'S CERTIFICATE OF MANUFACTURE AND TEST**

| | | |
|-----------------|--|--|
| 1. Description. | Type of Economiser No. of Sections Intended working pressure Year of manufacture Description | No. of tubes lbs. Total heating surface of tubes |
|-----------------|--|--|

| | | |
|---------------------------|---|-------------|
| 2. Inspecting Authority . | Economiser constructed under supervision of Sections hydraulically tested for inspected after test by | minutes and |
|---------------------------|---|-------------|

| | |
|---------------------------------------|--|
| 3. Construction and work- manship. | Details are in Drawing No. All castings are well finished, free from external defects, porous places and blow-holes and true to dimensions without warping. Where chaplets are used, there is satisfactory fusion with the metal. Chaplets are properly tinned with metal free from lead. All screw threads are of British Standard Whitworth form. All component parts are manufactured to limit gauges to secure interchangeability throughout. |
|---------------------------------------|--|

| | | | | |
|-------------------------------------|----------|-------|--------------------|---------|
| 4. Economiser parts and fittings | Material | Maker | Inspecting Officer | Remarks |
|-------------------------------------|----------|-------|--------------------|---------|

| | |
|----------------------------------|--|
| Particulars of material used. | Headers Tubes and/or Pipes. Valve chests Bolts |
|----------------------------------|--|

THICKNESS OF PARTS AND TENSILE TEST LIMITS

| 5. Part of Economiser | Thickness in 32nds | Tensile strength limits to tons | Elongation limits to % | Gauge length | Brand and No. |
|-----------------------|-----------------------|--|------------------------------|-----------------|------------------|
| Headers | | | | | |
| Tubes | | | | | |
| Boots | | | | | |

Certified that the particulars entered herein are correct and that the parts and fittings mentioned above have been used in the construction and fittings of the Economiser.

The particulars shown against the various parts used are in accordance with the Makers' certificates in our possession.

The design of the economiser in section and end view with principal parts fully dimensioned is that shown in drawing No. . The Economiser has been designed and constructed to comply with the Indian Boiler Regulations for a working pressure of lbs. per sq. in. at our Works abovementioned and the sections satisfactorily withstood a water test of lbs. per sq. in. for minutes on day of in the presence of our responsible representative whose signature is appended hereunder.

Designation of Maker.

Signature of Engineer who witnessed the test.

Dated at this day of

Signature of the Inspecting Authority

NOTE.—The drawing of the Economiser and Makers' certificate of manufacture showing results of tests for tensile strength and elongation must accompany this certificate and if the economiser has been built under the supervision of an Inspecting Authority, their certificate in Form VII must accompany.

FORM IX

(REGULATION 535)



INDIAN BOILERS ACT, 1923

BOILER INSPECTION DEPARTMENT

ECONOMISER

REGISTRY NUMBER

| |
|--|
| |
|--|

Memorandum of Inspection

OR

Registration Book

MISCELLANEOUS

District

Owners

Address of Factory

Nearest Railway Station

Economiser Registered at _____ **on** _____

Register Book No. _____ **page.** _____

Registry Number _____ **verified on** _____

Approved Working Pressure _____ **lbs.** _____

Economiser Rating _____ **Inspection fee.** _____

Registration book filed at _____ **on** _____

Remarks on transfers etc.

PROVISIONAL ORDER AND CERTIFICATE RECORD

| Fee | Date of payment | Date of inspection | Certificate No. and date | Period of Certificate | Working pressure | Economiser Rating | Remarks and Inspectors' initial |
|-----|-----------------|--------------------|--------------------------|-----------------------|------------------|-------------------|---------------------------------|
| | | | | | | | |

Type of economiser.....

Maker.....

Intended Working Pressure.....

Place and year of Make.....

Maker's No.....

Description of Economiser.....

No. of tubes.....Length.....Dia.....

Thickness.....

Internal dimensions.....

No. of Headers.....

Thickness of Headers.....

Length of Top Branch Pipe.....Thickness.....

Length of Bottom Branch Pipe.....Thickness.....

Dimensions of cap openings.....

Diameter of cap bolts.....

MOUNTINGS

| No. | Diameter | Type | Position | Material |
|--------------------------|----------|------|----------|----------|
| Safety Valve..... | | | | |
| Stop Valve..... | | | | |
| Blow Down..... | | | | |
| Thermometers..... | | | | |
| Pressure Gauge..... | | | | |
| Additional Fittings..... | | | | |

MAKERS' CERTIFICATES

Name of Maker.....

Makers' Hydraulic test Pressure.....

Maker's Drawing No.....

Name of Inspecting Authority.....

Name of Maker of Material.....

Process { Tubes

 { Headers.....

 { Bolts

Test Results

| | | |
|---------|---|---|
| Tubes | T | E |
| Headers | T | E |
| Pipes | T | E |
| Bolts | T | E |

% Sulphur.

% Phosphorus.

Makers Identification Marks.

Position.

CALCULATIONS

HEADERS

TUBES

BRANCH PIPES

BOLTS

HEATING SURFACE

Total Heating Surface

Economiser Rating

Calculations made by _____ submitted on _____

Calculations checked by _____ on _____

Least pressure, that for _____ lbs

Approved working pressure _____ lbs.

Chief Inspector's remarks and signature _____

INSPECTORS' NOTES

| | | |
|---|--|-------------------------|
| <i>Counter foil</i> | No. | FORM NO. |
| No. | | [Regulation 532(c)] |
| Name of person or firm to which provisional order is granted. | PROVISIONAL ORDER UNDER THE INDIAN BOILERS ACT, 1923 | |
| Description of Economiser | <p>.....</p> <p>.....</p> | |
| | are hereby permitted to use the | |
| | Economiser (RY No. | and |
| Makers No. | Economiser Rating | made by |
| | | and bearing Makers' No. |
| Rating. | at a maximum pressure of lbs. per sq. in./maxi- | |
| | mum temperature of °F. pending the issue or | |
| | refusal of a certificate within six months from the | |
| Pressure permitted | date hereof after which period this order will | |
| | become void. | |
| Period | | |
| Date | Dated at | this day of |
| | | |
| Inspector. | INSPECTOR. | |

FORM XI

..... Boiler Inspection Department.

CERTIFICATE FOR THE USE OF AN ECONOMISER

(Regulation 537)

Registry Number of Economiser.

Type.

No. of tubes.

Number of Headers.

Economiser Rating.

Place and year of manufacture

Name of Owner.

Situation of Economiser.

Repairs.

Remarks.

I/We hereby certify that the above described Economiser is permitted by me/Chief Inspector under the provisions of Section of the Indian Boilers Act, 1923 (V of 1923) to be worked at a maximum pressure of lbs. per sq. in./maximum temperature of °F. for the period from to

The loading of the Safety Valve is not to exceed—lbs.

Fee Rs. paid on

Dated at

This day of

COUNTERSIGNED.

INSPECTOR

CHIEF INSPECTOR

(REVERSE OF FORM XI)

CONDITIONS

(1) NO structural alteration, addition or renewal shall be made to the Economiser without written permission from the Chief Inspector.

(2) This certificate shall cease to be in force—

(a) on the expiry of the period for which it was granted, or

(b) when any accident occurs to the Economiser, or

(c) when any structural alteration, addition or renewal is made in or to the Economiser,
or,

(d) if the Chief Inspector in any particular case so directs when any structural alteration, addition or renewal is made in or to the Economiser, or

(e) on the communication to the owner of the Economiser of an order of the Chief Inspector or Inspector prohibiting its use on the ground that it is in a dangerous condition.

(3) The Economiser shall not be used at a pressure greater than the pressure/temperature entered in the certificate as maximum pressure/temperature nor with the safety valve set to pressure/temperature exceeding such maximum pressure/temperature.

(4) The Economiser shall not be used otherwise than in a condition which the owner reasonably believes to be compatible with safe working.

N.B. Details regarding this Economiser are recorded in a Registration Book No. of which a copy may be obtained on payment on application to the Chief Inspector.

